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ville monograph. The close and confidential relation with Dr. Emmons, who was one of the most careful and accurate of American geologists, as well as one of the best of men, was extremely influential upon the younger man. Irving also had experience while connected with the U. S. Geological Survey in the Globe district of Arizona; at Park City, Utah; in the Needle Mountains and at Lake City, Colorado; and in the coal regions of Indiana and Pennsylvania. In his later years he visited the western states and Alaska on mine examinations and in connection with apex litigation.

His first teaching experience came in 1903, when he substituted for Professor Wilbur C. Knight for a year at the University of Wyoming. He was called to Lehigh University in 1904, and to the Sheffield Scientific School of Yale in 1907. His work as editor began in 1905 when the magazine *Economic Geology* was established and he was the choice of its directors for managing editor.

Professor Irving has left a very creditable series of papers, which were issued during his connection with the U. S. Geological Survey. His work is marked by accuracy and patient care. He was not only a good observer, but possessed abilities of description and inference of a high order. In this group of his contributions the most elaborate will be the revised monograph on Leadville. While the fundamental observations and data were accumulated under Dr. S. F. Emmons' oversight and in no small degree by him personally, Dr. Emmons died when he had only prepared a few pages of introductory manuscript and the main work of composition was completed by Professor Irving and was done with scrupulous and almost filial devotion.

As editor of *Economic Geology* Dr. Irving was tireless and persevering. In large degree his efforts to secure papers brought to its pages the long list of striking and timely contributions with which they are crowded. He obtained thereby a wide and intimate acquaintance with topics of interest. He himself made especially thoughtful and suggestive contributions on the criteria for identifying

replacement-deposits; on the causes which localize ore-shoots; and on the importance of having the same observer study large problems in many localities, rather than work out the details and teachings of a single district.

Dr. Irving had a fine sense of clear and finished literary expression, as might justly have been expected of one whose direct forbear was Washington Irving's brother; and whose father's work was marked by the same characteristics. In disposition he was considerate, kindly and affectionate, such that he was greatly endeared to his friends.

When German ambitions and hostility in the spring of 1916 began to threaten the United States with the grim possibility of war, Professor Irving went to the officers' training camp at Plattsburg. Being unmarried he felt it his duty to fit himself for service and at the close of the training period handed in his name as available if needed. In the spring of 1917 he was called and passed his examinations for a captaincy. He was commissioned in the 11th U. S. Engineers, "the fighting Engineers" as they have been known since Cambrai. He sailed for France in July, 1917, and had been building railroads and giving instruction to young officers in mining engineering as long and continuously as he was able. His strength became overtaxed, and when an attack of Spanish grippe developed into pneumonia, he could not resist it. He passed away July 20, in Flanders, and his name was entered on the Roll of Honor.

JAMES F. KEMP

RACE-APPRECIATION IN LATIN AMERICA

ANTHROPOLOGISTS, in their elaborate, careful and invaluable researches into the past history of the native race of the American continent, have been wont to devote the major part of their space to the *former* cultural attainments of that race. They ignore the fact that, in Mexico, in some of the Central American countries, in Colombia, and in the Andean countries (Ecuador, Peru and Bolivia), that race is to-day anywhere from sixty-five to eighty-five per cent. of the total population.

Of course the degree of racial purity varies considerably, but this high percentage includes all those who have an obvious and undeniable admixture of indigenous blood. For this reason it is exceedingly important that anthropologists, who are already well informed as to the *past* of these people, should, for the sake of our continent as a whole, set themselves to learn about their *present* status.

A beginning of this necessary study has already been made. In Mexico, the well-known archeologist, Manuel Gamio, is now the head of a branch of the Secretaria de Fomento which has as its purpose the collection of data relating to the present numbers, cultural and economic condition of the Indians, and to the steps that should be taken to insure their highest development, not only on their own account, but for the sake of the benefits that will accrue to the state from such a policy. The work of Gamio's Dirección de estudios arqueológicos y etnográficos has already been sketched by him in a recently published book.¹ It is quite clear to any one who reads this remarkable little book with due care that the fundamental trouble with Mexico is not, as most of us North Americans are wont to think, some inherent wickedness and turbulence on the part of the Mexicans, but that it arises from the maladjustment of Mexico's political institutions to her racial and psychological temperament. It is Gamio's purpose to change this condition so as to make available to Mexico the great store of strength and virtue which lies hidden in the hitherto misunderstood and despised Indian element. To do this drastic reforms in the educational, agrarian and economic institutions of the country will doubtless be necessary. Time and study will reveal just what is needed.

A situation very similar to that in Mexico exists in many other Latin American countries, as I have said. It has been my especial good fortune to study this matter in Peru

¹ Gamio, Manuel, "Forjando Patria," Mexico, 1916. Should any one who reads this article care to have a copy of Mr. Gamio's work (which is in Spanish), I shall be glad to supply him with a copy gratis so long as the very few which I have hold out. My address is given below.

and Bolivia. Because of my first-hand knowledge of the importance of race-appreciation in those countries I may speak about it fully, for it is an important matter. Before proceeding further, I would better define the term I have used. Race-appreciation is the study of those cultural elements which survive from the formerly independent cultural state of the Indians (or any similarly subjected race) into our own day. It seeks to blend all that is best in them, with all that is best in white culture so that the dual population of such countries shall have institutions based upon those of both component races.

The matter of race-appreciation in the Andean countries is of the highest importance for their future development. On the coast the present situation of the Indians is not by any means of the worst. Many of their own social and governmental institutions survive, which makes for contentment on their part and for a firm but kindly control by the whites of the upper class. As elsewhere in the Andes, the land almost all belongs to very large landed estates. The owners of these, for the most part, differ from their Mexican counterparts in not being oppressive and unjust. I have known a great many people of this class in different parts of Peru, and I can say frankly that not only are they progressive and eager to better the conditions of their native tenants but also that the Indians esteem and like them. Nevertheless, a process of reform, especially with regard to sanitary conditions, housing, clothing, pastimes and working-places, would be of inestimable value, especially if it were so conducted as to take over the native administrative system (based on families, clans and tribes) and made use, at the same time, of the special skill of these people in such matters as weaving, irrigating and building.

To reduce the matter to concrete terms I will speak of each one of these three aptitudes in terms of what might be done to make them useful to modern society. In the first place, I will venture to remind the reader that in pre-Columbian times the people of the Peruvian coast made the finest cotton and woollen

textiles that have ever been made. Not only were they strong and durable, as well as of fine texture, but they were also exquisitely dyed with tasteful designs. Some of them were wonderfully embroidered; still others had striking patterns painted upon them. To-day the cotton raised on the Peruvian coast is rapidly getting to be the best grown anywhere. The supply of llama and alpaca wool might soon be vastly improved if care were devoted to the matter. Furthermore, there is no reason why, after necessary experiments as to methods had been made, the two other great fabric materials of the world (linen and silk) should not be grown in Peru. With plenty of raw material at hand, why could not steps be taken to make use of the weaving ability which to-day is remarkably strong in the coast Indians? Of course, to put such an enterprise on a modern and economically productive basis weaving machinery would have to be used. But that would prove no drawback, as far as the people themselves are concerned. They are very intelligent, and they take quickly to mechanical contrivances, as is proved by the success with which Indians are used in cotton gins, sugar mills and similar places. Perhaps it would be best to work out some variety of loom half-way between their hand-loom and our North American type. This might result in giving greater play to their natural genius for weaving.

In the matter of irrigating the Indians long ago proved themselves adepts. Steps should be taken to encourage them to re-irrigate those parts of the country in which the old irrigating canals were destroyed by the Spaniards. To encourage this, the owners of the land could hold out special rewards to enterprising Indians, such as practical freehold (long lease or a percentage in the profits). The whites have not the aptitude in this direction that the Indians have. White engineers, in their eagerness to plan and build enormous hydraulic works that would cost millions, lose sight entirely of the tremendous amount of work that once was and could again be done in a small way, by building slowly a little at a time. In many cases, the engineering prob-

lems involved, especially those which concern the restoration to use of ancient irrigation canals, are not of great difficulty, and more could be done along the piecemeal, bit by bit line than by elaborate dams and prohibitively expensive pumping works.

In the matter of architecture, the ancient pottery of the coast people shows us that the people used to build houses which were not only tasteful and picturesque but were airy and cool as well. They had gabled roofs, made of thick thatch, and thick walls of adobe. There were windows of various odd and quaint shapes, as well as doors. When one compares these admirable structures to the wretched flimsy huts made of cornstalks and old tin cans daubed over with mud which serve the people to-day, he sees how much better was their old condition. If the ancient skill of these people in making fine and durable adobe could be turned to the manufacture of the still better concrete, and if the systematic use of good houses designed after those anciently used could be introduced, the living conditions, health, productiveness and vigor of the people would mount rapidly.

In all these directions, as well as in others which lack of space forbids me to mention, there is imperative need of a judicious adaptation to modern needs of the inherent abilities of the people.

In the highlands, the situation is far less satisfactory. The climate is cold and depressing. There is a general lack of fuel for warming the houses and for warming water for bathing purposes. In addition, there is the necessity of constant and very heavy labor if any but the most meager crops are to be raised. Alcoholism is a pronounced evil in the highlands. As a result of all these sadly adverse circumstances, the people are doltish, filthy and depraved, not only the Indians but also some of the whites. It is for the more felicitously situated and enlightened elements of the population to do what they can, especially by rigidly enforcing the laws to curb alcoholism, to ameliorate these conditions. Race-appreciation here, as on the coast, must play an important part, for today almost nothing is

being done to study the Indians and their peculiar abilities in weaving, handicrafts, mason-work, irrigation and other directions for the sake of adapting them to modern requirements. For one thing, I believe that the Andean countries are capable of becoming leaders in the production of cattle and sheep. The present stock, however, requires to be improved by new blood. Then too, the native wool-yielding animals, the llama, alpaca and vicuña, should be studied and taken care of. For all this the highland Indians supply the necessary labor element. If shaken loose from their alcoholism and their resultant depraved ways, and if given decent living conditions, they would rapidly become fine sturdy peasants equal in capacity and intelligence to the peasants of Switzerland. So many travelers and superficial observers who have not lived among these people or who have not observed them with sympathetic eyes have told the world that their condition is hopeless that many people now believe it is so. I am sure, however, that, given proper aid now, the Indian mountaineers could be lifted into the state which I have mentioned.

To conclude I will present several reasons for the necessity of anthropologists' doing what they can to aid in race-appreciation, especially as regards the countries under consideration.

1. The indigenous element, more or less pure, forms so large a part of the entire population that it is positively dangerous not to develop to the utmost all its latent capabilities. If this is not done these countries will find themselves weighed down with an enormous element which is not merely economically underproductive, but which is really vicious and seditious, productive of all manner of social evils, the result of four centuries of bad treatment by white men.

2. If race-appreciation is seriously instituted, the countries where it takes effect will find that their commercial output will increase rapidly on account of the increased mental and physical vitality of the great majority of the people. The population will not only grow fast because of the cutting

down of the death-rate, but those who live will work better and will be stronger and happier than their forebears of the days since the Conquest.

3. If steps are taken by the various owners of large landed estates in the Latin American countries under consideration to learn about the Indian or labor element of their tenantry, either from professional anthropologists and ethnologists or from their own observations, and if they will seriously undertake the reforms that may be found necessary, the result may be that salutary one of showing the world that it is possible for distinct classes to work together in harmony and without constant irritation and recriminations.

4. On account of natural conditions involved in the climate and geography of the countries under discussion European immigration on a large scale will never take place. Indeed, there is a general apprehension in those parts that the small supply of mechanics and other specialists who hitherto have come from Europe and North America will, on account of war- and post-war conditions, presently cease to be available. It is obvious, therefore, that if those countries wish to progress according to modern standards they will either have to try the rather perilous experiment of importing large numbers of Orientals and Pacific Islanders, or they will have to take immediate steps toward bringing their present population to as high a level of development as possible. This can only be done in accordance with the principles of race-appreciation. It should be done soon.

Although I have been speaking of America especially, I wish to remark before concluding this brief sketch that race-appreciation may be said to be needed in every country where the white race has imposed its dominion upon some other race with a more or less vigorous cultural character of its own. The British, in India, Burmah and other colonies of theirs have been, half unconsciously, following these principles for decades. That explains their success. The same may be said of the French in Annam, Morocco and Algeria. It is ob-

vious that no other policy than that based upon race-appreciation is either just or stable.

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THE AMERICAN SYSTEM OF AGRICULTURAL EDUCATION AND RESEARCH AND ITS ROLE IN HELPING TO WIN THE WAR¹

THE United States has, in its Federal Department of Agriculture and state (land-grant) colleges of agriculture, a system of agricultural research and education which was established more than 50 years ago and which reaches every part of the country and effectively deals with every phase of agriculture. It is worth noting that the national foundations of these two great agencies for the betterment of agriculture were laid in another period of great national stress.

The act of Congress creating the Federal Department of Agriculture was signed by Abraham Lincoln on May 15, 1862, while the Civil War was in progress. On July 2 of the same year he approved the so-called land-grant, or Morrill, act, giving the proceeds from the sale of certain allotments of the public land to each state and territory for "the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

The national system of agriculture, education and research thus established has been greatly developed by subsequent legislation, notably the acts providing for agricultural experiment stations in each state and for co-operative extension work in agriculture and home economics. Many other important and highly significant laws for the betterment of rural life have been placed on the statute

books within the past few years, including especially the cotton-futures act, the United States grain-standards act, the Federal warehouse act, and the Federal aid road act. All these measures are administered by the Department of Agriculture and they are achieving, in marked degree, the purposes contemplated by their framers. The federal reserve act, the farm-loan act, and the federal vocational education act also constitute an important part of the legislative program for the improvement of rural conditions and the development of agriculture. Thus the nation was well prepared along agricultural lines to deal promptly and effectively with the emergency problems that have arisen since the United States entered the war. It is not extravagant to say that this nation had agencies working for the betterment of rural life and agriculture which, in point of personnel and effectiveness, exceed those of any other three nations in the world combined.

The land-grant colleges and experiment stations are without parallel. They are 67 in number, have a total valuation of endowment, plant, and equipment of \$195,000,000; an income of more than \$45,000,000, with 5,900 teachers; a resident student body of over 75,000, and a vast number receiving extension instruction. Their great ally, the Department of Agriculture, is unquestionably the greatest practical and scientific agricultural organization in the world. It has a staff of more than 20,000 people, many of them highly trained experts, and a budget of approximately \$65,000,000.

The graduate and collegiate instruction and the research work inaugurated by these agencies take rank with the best in the world. As the result, a large corps of leaders and specialists, capable of dealing efficiently not only with the vital question of agricultural production, but also with important war problems not directly connected with agriculture, has been trained. Through the educational work of the colleges a great impulse has been given to vocational training in agriculture and through the research work of the Federal Department and the experiment stations a great

¹ *Weekly News Letter*, Department of Agriculture.